WA 2917
12·2·92
89

PROJECT MEMORANDUM

DATE: December 2, 1992

TO: Joe Depner, Hydrogeologist

FROM: Nels Cone, Chemist

SUBJECT: DATA VALIDATION OF ANALYTICAL RESULTS FROM PIER 91 RCRA FACILITY INVESTIGATION, PROJECT 624878, DATA SET #3A

On September 16, 1992, soil samples were collected by Burlington Environmental Inc. (Burlington). These samples were submitted to Sound Analytical Services of Tacoma, Washington for semivolatile compound (EPA SW-846 Method 8270) and Total Petroleum Hydrocarbon (EPA SW-846 Methods 418.1 and 8015) analyses. I performed a review of the analytical results on the samples CP-HA-7-1.5-2 and CP-HA-7-3-3.5.

Properly completed chain-of-custody forms were included, along with documented signatures from field to laboratory receipt. The samples were shown as having been properly iced and received in good condition. Holding times were clearly written and evaluated according to regulatory protocol (*National Functional Guidelines for Organic Data Review*, USEPA, 1990). The samples received the requested analyses, and laboratory extraction/analysis times met the established guidelines.

Duplicate analyses were performed as required by the Quality Assurance Project Plan (QAPP), and relative percent differences (RPD) between individual results were shown to be within quality control (QC) guidelines. Method blanks and matrix spike/matrix spike duplicate analyses displayed surrogate recoveries well within required QC limits. Supporting documentation for these analyses included instrument calibration/tuning data, and chromatographic/mass spectral data. Data consistency was demonstrated throughout.

Analytical results from these analyses indicate elevated levels of hydrocarbon compounds in all samples tested. The samples required dilution to ensure that target analyses were within the instrument calibration range. As a result, elevated detection limits were reported, and sample surrogate recoveries were outside normal QC limits. Regardless, the data quality objectives as defined in Table F-2 of the QAPP are met.

Proper data qualifier flags accompanied the analytical results as needed, and their use is consistent with USEPA guidelines. Accordingly, this data set can be considered valid for its intended use.

NC/rlk/b41:1920b.mem

Data Set #3A

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

ANALYTICAL NARRATIVE

Client: Burlington Environmental Engineering

Date: October 22, 1992

Project: 624878 Pier 91

Lab No.: 27191

Delivered by: SAS

Date Sampled: 09-16-92

Condition of Samples upon Receipt: Samples were received cold and in good condition. Chain-of-custody was in order.

SAMPLE EXTRACTION AND ANALYSIS

Samples 27191-1 and 27191-2 were analyzed for total petroleum fuel hydrocarbons in accordance with EPA SW-846 Modified Method 8015. The soil samples were extracted on 09-24-92 and analyzed on 09-29-92. Ten-fold dilutions were required prior to analysis due to the high concentration of petroleum hydrocarbons present in both samples. The surrogate recoveries could not be calculated for these samples due to the required dilutions.

The contaminant present in the samples appeared to be heavy oil. The reported concentrations were based on the diesel calibration curve and should be considered estimated quantities. The 418.1 analysis may be more appropriate for determining contaminant concentrations.

Samples 27191-1 and 27191-2 were analyzed for total petroleum hydrocarbons in accordance with EPA Method 418.1. The soil samples were extracted on 09-22-92 and analyzed on 09-23-92. 1:100 dilutions were performed prior to analysis due to the high concentration of petroleum hydrocarbons present in the samples.

Samples 27191-1 and 27191-2 were analyzed for semivolatile organics by GC/MS in accordance with EPA SW-846 Method 8270. The soil samples were extracted on 09-23-92 and analyzed on 09-29-92. The quantitation limits for these samples was elevated due to the high concentrations of non-TCL analytes present in the samples.

All Quality Control was within acceptable limits.

Results for soil samples were reported on a dry weight basis.

No blank correction was employed

Data qualifier definitions are attached to the report.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Burlington Environmental Engineering

Date: October 21, 1992

Report On: Analysis of Soil

Lab No.: 27191

IDENTIFICATION:

Samples Received on 09-17-92

Project: 624878 Pier 91

ANALYSIS:

Lab No. 27191-1

Client ID: CP-HA7-1.5-2

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 9-23-92

Date Analyzed: 9-29-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAGS
108-95-2	Phenol	ND	15,000	
111-44-4	bis(2-Chloroethyl) ether	ND	15,000	
95-57-8	2-Chlorophenol	ND	15,000	
541-73-1	1,3-Dichlorobenzene	ND	15,000	
106-46-7	1,4-Dichlorobenzene	ND	15,000	
100-51-6	Benzyl Alcohol	ND	30,000	
95-50-1	1,2-Dichlorobenzene	ND	15,000	
95-48-7	2-Methylphenol	ND	15,000	
39638-32-9	bis(2-Chloroisopropyl)ether	ND	15,000	
106-44-5	4-Methylphenol	ND	15,000	
621-64-7	N-Nitroso-Di-N-propylamine	ND	15,000	
67-72-1	Hexachloroethane	ND	15,000	
98-95-3	Nitrobenzene	ND	15,000	
78-59-1	Isophorone	ND	15,000	
88-75-5	2-Nitrophenol	ND	15,000	
105-67-9	2,4-Dimethylphenol	ND	15,000	
65-85-0	Benzoic Acid	ND	76,000	
111-91-1	bis(2-Chloroethoxy)methane	ND	15,000	
120-83-2	2,4-Dichlorophenol	ND	15,000	
120-82-1	1,2,4-Trichlorobenzene	ND	15,000	
91-20-3	Naphthalene	8,600	15,000	J
106-47-8	4-Chloroaniline	ND	30,000	
87-68-3	Hexachlorobutadiene	ND	15,000	
59-50-7	4-Chloro-3-methylphenol	ND	30,000	

ND - Not Detected

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27191
October 21, 1992

Lab No. 27191-1 Client ID: CP-HA7-1.5-2

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAGS
91-57-6	2-Methylnaphthalene	25,000	15,000	
77-47-4	Hexachlorocyclopentadiene	ND	15,000	
88-06-2	2,4,6-Trichlorophenol	ND	15,000	
95-95-4	2,4,5-Trichlorophenol	ND	15,000	
91-58-7	2-Chloronaphthalene	ND	15,000	
88-74-4	2-Nitroaniline	ND	76,000	
131-11-3	Dimethyl phthalate	ND	15,000	
208-96-8	Acenaphthylene	ND	15,000	
606-20-2	2,6-Dinitrotoluene	ND	15,000	
99-09-2	3-Nitroaniline	ND	76,000	
83-32-9	Acenaphthene	3,700	15,000	J
51-28-5	2,4-Dinitrophenol	ND	76,000	
100-02-7	4-Nitrophenol	ND	76,000	
132-64-9	Dibenzofuran	ND	15,000	
121-14-2	2,4-Dinitrotoluene	ND	15,000	
84-66-2	Diethylphthalate	ND	15,000	
7005-72-3	4-Chlorophenyl phenyl ether	ND	15,000	
86-73-7	Fluorene	4,600	15,000	J
100-01-6	4-Nitroaniline	ND	76,000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	76,000	
86-30-6	N-Nitrosodiphenylamine	ND	15,000	
101-55-3	4-Bromophenyl phenyl ether	ND	15,000	
118-74-1	Hexachlorobenzene	ND	15,000	
87-86-5	Pentachlorophenol	ND	76,000	
85-01-8	Phenanthrene	17,000	15,000	
120-12-7	Anthracene	ND	15,000	
84-74-2	Di-n-butylphthalate	ND	15,000	

ND - Not Detected

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27191
October 21, 1992

Lab No. 27191-1 Client ID: CP-HA7-1.5-2

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAGS
206-44-0	Fluoranthene	ND	15,000	
129-00-0	Pyrene	7,800	15,000	J
85-68-7	Butyl benzyl phthalate	ND	15,000	
91-94-1	3,3'-Dichlorobenzidine	ND	30,000	
56-55-3	Benzo(a)anthracene	ND	15,000	
218-01-9	Chrysene	ND	15,000	
117-81-7	bis(2-ethylhexyl)phthalate	ND	15,000	
117-84-0	Di-n-octyl phthalate	ND	15,000	
205-99-2	Benzo(b)fluoranthene	ND	15,000	
207-08-9	Benzo(k)fluoranthene	ND	15,000	
50-32-8	Benzo(a)pyrene	ND	15,000	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	15,000	
53-70-3	Dibenz(a,h)anthracene	ND	15,000	
191-24-2	Benzo(g,h,i)perylene	ND	15,000	

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Results are reported on a dry weight basis.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits Water	Control Limits Soil
Nitrobenzene - d_5	Diluted	35 - 114	23 - 120
2-Fluorobiphenyl		43 - 116	30 - 115
p-Terphenyl-d_{14}		33 - 141	18 - 137
Phenol-d_6	Out	10 - 94	24 - 113
2-Fluorophenol		21 - 100	25 - 121
2,4,6-Tribromophenol		10 - 123	19 - 122

Continued . . . .

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27191
October 22, 1992

Lab No. 27191-1 Client ID: CP-HA7-1.5-2

TPH Per EPA Method 418.1
Date Extracted: 9-22-92
Date Analyzed: 9-23-92

Total Petroleum Hydrocarbons, mg/kg	59,000

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-24-92
Date Analyzed: 9-29-92

Total Petroleum Fuel Hydrocarbons, mg/kg	32,000	X2

TPH as Aged Gas, Heavy Oil and Diesel

SURROGATE RECOVERY, %	
1-Chlorooctane	X8
O-Terphenyl	X8

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27191
October 21, 1992

Lab No. 27191-2 Client ID: CP-HA7-3-3.5

Semivolatile Organics Per EPA SW-846 Method 8270
Date Extracted: 9-23-92
Date Analyzed: 9-29-92

CAS No.	Compounds	Concentration ug/kg	PQL
108-95-2	Phenol	ND	14,000
111-44-4	bis(2-Chloroethyl) ether	ND	14,000
95-57-8	2-Chlorophenol	ND	14,000
541-73-1	1,3-Dichlorobenzene	ND	14,000
106-46-7	1,4-Dichlorobenzene	ND	14,000
100-51-6	Benzyl Alcohol	ND	29,000
95-50-1	1,2-Dichlorobenzene	ND	14,000
95-48-7	2-Methylphenol	ND	14,000
39638-32-9	bis(2-Chloroisopropyl)ether	ND	14,000
106-44-5	4-Methylphenol	ND	14,000
621-64-7	N-Nitroso-Di-N-propylamine	ND	14,000
67-72-1	Hexachloroethane	ND	14,000
98-95-3	Nitrobenzene	ND	14,000
78-59-1	Isophorone	ND	14,000
88-75-5	2-Nitrophenol	ND	14,000
105-67-9	2,4-Dimethylphenol	ND	14,000
65-85-0	Benzoic Acid	ND	72,000
111-91-1	bis(2-Chloroethoxy)methane	ND	14,000
120-83-2	2,4-Dichlorophenol	ND	14,000
120-82-1	1,2,4-Trichlorobenzene	ND	14,000
91-20-3	Naphthalene	16,000	14,000
106-47-8	4-Chloroaniline	ND	29,000
87-68-3	Hexachlorobutadiene	ND	14,000
59-50-7	4-Chloro-3-methylphenol	ND	29,000

ND - Not Detected

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27191
October 21, 1992

Lab No. 27191-2 Client ID: CP-HA7-3-3.5

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAGS
91-57-6	2-Methylnaphthalene	44,000	14,000	
77-47-4	Hexachlorocyclopentadiene	ND	14,000	
88-06-2	2,4,6-Trichlorophenol	ND	14,000	
95-95-4	2,4,5-Trichlorophenol	ND	14,000	
91-58-7	2-Chloronaphthalene	ND	14,000	
88-74-4	2-Nitroaniline	ND	72,000	
131-11-3	Dimethyl phthalate	ND	14,000	
208-96-8	Acenaphthylene	ND	14,000	
606-20-2	2,6-Dinitrotoluene	ND	14,000	
99-09-2	3-Nitroaniline	ND	72,000	
83-32-9	Acenaphthene	6,100	14,000	J
51-28-5	2,4-Dinitrophenol	ND	72,000	
100-02-7	4-Nitrophenol	ND	72,000	
132-64-9	Dibenzofuran	ND	14,000	
121-14-2	2,4-Dinitrotoluene	ND	14,000	
84-66-2	Diethylphthalate	ND	14,000	
7005-72-3	4-Chlorophenyl phenyl ether	ND	14,000	
86-73-7	Fluorene	8,600	14,000	J
100-01-6	4-Nitroaniline	ND	72,000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	72,000	
86-30-6	N-Nitrosodiphenylamine	ND	14,000	
101-55-3	4-Bromophenyl phenyl ether	ND	14,000	
118-74-1	Hexachlorobenzene	ND	14,000	
87-86-5	Pentachlorophenol	ND	72,000	
85-01-8	Phenanthrene	32,000	14,000	
120-12-7	Anthracene	ND	14,000	
84-74-2	Di-n-butylphthalate	ND	14,000	

ND - Not Detected

Continued . . . . .

Burlington Environmental, Engineering
Project: 624878

Lab No. 27191
October 22, 1992

Lab No. 27191-2 Client ID: CP-HA7-3-3.5

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAGS
206-44-0	Fluoranthene	6,300	14,000	J
129-00-0	Pyrene	11,000	14,000	J
85-68-7	Butyl benzyl phthalate	ND	14,000	
91-94-1	3,3'-Dichlorobenzidine	ND	29,000	
56-55-3	Benzo(a)anthracene	ND	14,000	
218-01-9	Chrysene	ND	14,000	
117-81-7	bis(2-ethylhexyl)phthalate	ND	14,000	
117-84-0	Di-n-octyl phthalate	ND	14,000	
205-99-2	Benzo(b)fluoranthene	ND	14,000	
207-08-9	Benzo(k)fluoranthene	ND	14,000	
50-32-8	Benzo(a)pyrene	ND	14,000	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	14,000	
53-70-3	Dibenz(a,h)anthracene	ND	14,000	
191-24-2	Benzo(g,h,i)perylene	ND	14,000	

ND - Not Detected
PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Results are reported on a dry weight basis.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits Water	Soil
Nitrobenzene - d_5	Diluted	35 - 114	23 - 120
2-Fluorobiphenyl		43 - 116	30 - 115
p-Terphenyl-d_{14}	Out	33 - 141	18 - 137
Phenol-d_6		10 - 94	24 - 113
2-Fluorophenol		21 - 100	25 - 121
2,4,6-Tribromophenol		10 - 123	19 - 122

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27191
October 21, 1992

Lab No. 27191-2 Client ID: CP-HA7-3-3.5

TPH Per EPA Method 418.1
Date Extracted: 9-22-92
Date Analyzed: 9-23-92

Total Petroleum Hydrocarbons, mg/kg	66,000

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-24-92
Date Analyzed: 9-29-92

Total Petroleum Fuel Hydrocarbons, mg/kg	46,000	X2

TPH as Aged Gas, Heavy Oil and Diesel

SURROGATE RECOVERY, %

1-chlorooctane	X8
o-terphenyl	X8

SOUND ANALYTICAL SERVICES

DENNIS L. BEAN

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

QUALITY CONTROL REPORT

TPH by Method 418.1

Client: Burlington Environmental, Engineering
Lab No: 27191qc1
Matrix: Soil
Units: mg/kg
Date: October 21, 1992

DUPLICATE

Dup No. 27191-2

Parameter	Sample(S)	Duplicate(D)	RPD
Total Petroleum Hydrocarbons	110	110	0.0

RPD = Relative Percent Difference
= [(S - D) / ((S + D) / 2] x 100

METHOD BLANK

Parameter	Blank Value
Total Petroleum Hydrocarbons	< 10

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Client: Burlington Environmental, Engineering
Lab No: 27191qc2
Units: ug/kg
Date: October 21, 1992
Blank No: S6248

METHOD BLANK

Compound	Blank Value	PQL
Phenol	ND	330
bis(2-Chloroethyl) ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
Benzyl Alcohol	ND	670
1,2-Dichlorobenzene	ND	330
2-Methylphenol	ND	330
bis(2-Chloroisopropyl)ether	ND	330
4-Methylphenol	ND	330
N-Nitroso-Di-N-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	330
2,4-Dimethylphenol	ND	330
Benzoic Acid	ND	1,700
bis(2-Chloroethoxy)methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
4-Chloroaniline	ND	670
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	670
2-Methylnaphthalene	ND	330
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2,4,5-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
2-Nitroaniline	ND	1,700
Dimethyl phthalate	ND	330
Acenaphthylene	ND	330

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Client: Burlington Environmental, Engineering
Lab No: 27191qc2
Units: ug/kg
Date: October 21, 1992
Blank No: S6248

METHOD BLANK

Compound	Blank Value	PQL
3-Nitroaniline	ND	1,700
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	1,700
4-Nitrophenol	ND	1,700
Dibenzofuran	ND	330
2,4-Dinitrotoluene	ND	330
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl phenyl ether	ND	330
Fluorene	ND	330
4-Nitroaniline	ND	1,700
4,6-Dinitro-2-methylphenol	ND	1,700
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl phenyl ether	ND	330
Hexachlorobenzene	ND	330
Pentachlorophenol	ND	1,700
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	580	330
Fluoranthene	ND	330
Pyrene	ND	330
Butyl benzyl phthalate	ND	330
3,3'-Dichlorobenzidine	ND	670
Benzo(a)anthracene	ND	330
bis(2-ethylhexyl)phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)fluoranthene	ND	330
Benzo(a)pyrene	ND	330
Indeno(1,2,3-cd)pyrene	ND	330
Dibenz(a,h)anthracene	ND	330
Benzo(g,h,i)perylene	ND	330

Continued. . . . .

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Client: Burlington Environmental, Engineering
Lab No: 27191qc2
Units: ug/kg
Date: October 21, 1992
Blank No: S6248

ND = Not Detected.

PQL = Practical Quantitation Limit - These are the detection limits for this sample. This number is based on sample size, matrix and dilution required.

SEMIVOLATILE SURROGATES

Surrogate	Percent Recovery	Control Limits Water	Soil
Nitrobenzene - d5	82	35 - 114	23 - 120
2-Fluorobiphenyl	70	43 - 116	30 - 115
p-Terphenyl-d14	69	33 - 141	18 - 137
Phenol-d6	79	10 - 94	24 - 113
2-Fluorophenol	86	21 - 100	25 - 121
2,4,6-TBP	83	10 - 123	19 - 122

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

QUALITY CONTROL REPORT

Total Petroleum Fuel Hydrocarbons
by Method 8015

Client: Burlington Environmental, Engineering
Lab No: 27191qc3
Units: mg/kg
Date: October 21, 1992

METHOD BLANK

Parameter	Blank Value
Total Petroleum Fuel Hydrocarbons	< 10
SURROGATE RECOVERY%	
1-chlorooctane	92
o-terphenyl	89

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

SOIL MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

Client Name: Burlington Environmental Engineering
Lab No: 27191qc4
Date: November 9, 1992

SEMI-VOLATILE ORGANICS

COMPOUND	SPIKE (ug/kg)	SAMPLE RESULT	CONC MS	% REC	CONC MSD	% REC	RPD
1,2,4-Trichlorobenzene	3,600	ND	2,600	72	2,600	72	0
Acenaphthene	3,600	ND	3,000	83	2,800	78	6
2,4 Dinitrotoluene	3,600	ND	2,800	78	2,700	75	4
Pyrene	3,600	ND	3,500	97	3,300	92	5
N-nitrosodi-n-Propylamine	3,600	ND	3,300	92	3,300	92	0
1,4-Dichlorobenzene	3,600	ND	2,400	67	2,400	67	0
Pentachlorophenol	3,600	ND	2,000	56	2,000	56	0
Phenol	3,600	ND	2,700	75	2,800	78	4
2-Chlorophenol	3,600	ND	2,800	78	2,900	81	4
4-Chloro-3-Methylphenol	3,600	ND	2,500	69	2,500	69	0
4-Nitrophenol	3,600	ND	1,200	33	1,300	36	9

RPD = Relative Percent Difference
% REC = Percent Recovery

*QC Limits:	RPD	% RECOVERY
1,2,4-Trichlorobenzene	23	38-107
Acenaphthene	19	31-137
2,4 Dinitrotoluene	47	28-89
Pyrene	36	35-142
N-nitrosodi-n-Propylamine	38	41-126
1,4-Dichlorobenzene	27	28-104
Pentachlorophenol	47	17-109
Phenol	35	26-90
2-Chlorophenol	50	25-102
4-Chloro-3-Methylphenol	33	26-103
4-Nitrophenol	50	11-114

* These are advisory limits only.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

WTPH-D (Diesel Range Organics)

Client: Burlington Environmental Engineering
Lab No: 27191qc5
Matrix: Soil
Units: mg/kg
Date: November 9, 1992

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

MS/MSD No: 27191 Batch QC

Parameter	Lab No.	Sample Result (SR)	Spiked Sample Result (MS)	Spike Added (SA)	%R	Spike Dup Result (MSD)	RPD
Diesel	27179-6ms	412	755	446	76.9	800	5.8
Diesel	27179-6msd	412	800	446	87.0	---	---

%R = Percent Recovery
= [(MS - SR) / SA] x 100

RPD = Relative Percent Difference
= [(MS - MSD) / ((MS + MSD) / 2] x 100

SOUND ANALYTICAL SERVICES, INC.

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DATA QUALIFIER FLAGS

ND: Indicates that the analyte was analyzed for but was not detected. The associated numerical value is the practical quantitation limit, corrected for sample dilution.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

C: The identification of this analyte was confirmed by GC/MS.

B: This analyte was also detected in the associated method blank. There is a possibility of blank contamination.

E: The concentration of this analyte exceeded the instrument calibration range.

D: The reported result for this analyte is calculated based on a secondary dilution factor.

A: This TIC is a suspected aldol-condensation product.

M: Quantitation Limits are elevated due to matrix interferences.

S: The calibration quality control criteria for this compound were not met. The reported concentration should be considered an estimated quantity.

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.

X2: Contaminant does not appear to be "typical" product. Further testing is suggested for identification.

X3: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is recommended.

X4: RPD for duplicates outside QC limits. Sample was re-analyzed with similar results. Sample matrix is nonhomogeneous.

X4a: RPD for duplicates outside QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike was diluted out during analysis.

X6: Recovery of matrix spike outside QC limits. Sample was re-analyzed with similar results.

X7: Recovery of matrix spike outside QC limits. Matrix interference is indicated by blank spike recovery data.

X8: Surrogate was diluted out during analysis.

X9: Surrogate recovery outside QC limits due to matrix composition.

X10: Surrogate recovery outside QC limits due to high contaminant levels.

Data Set #3

CHAIN OF CUSTODY

BURLINGTON
ENVIRONMENTAL

210 West Sand Bank Road
P.O. Box 330
Columbia, IL 62236-0330
618/281-7173
618/281-5120 FAX

CHAIN-OF-CUSTODY RECORD

C.O.C. SERIAL NO. 6060

PROJECT NAME PIER 91
PROJECT NUMBER 62/875 MAJOR TASK
SAMPLERS J. PEARCE
LAB DESTINATION SOUND ANALYTICAL

SAMPLE NO.	DATE	TIME	COMP	GRAB	SAMPLE LOCATION	NO. OF CONTAINERS	TYPE OF ANALYSIS: BNA	TPM 418.1	TPH 8015					PRESERVATIVES: ICED	PRESERVATIVES: CHEMICALS ADDED	REMARKS (CHEMICAL ANALYSIS REQUEST FORM NUMBER IF APPLICABLE)
	9-16	1015		X	CP-HA7-1.5-2	1	X	X	X					X		SAMP. LOC'N: CP-HA7-1.5-2
	9-16	1045		X	CP-HA7-3-3.5	1	X	X	X					X		

RELINQUISHED BY

SIGNATURE	DATE	TIME
[signature]	9-17	1015

RECEIVED BY

SIGNATURE	DATE	TIME
[signature]	9/17	10:15A

SHIPPING NOTES

LAB NOTES

BE-34 (1/92)